APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,338	03/22/2004	Shin-ichi Nishizono	1075.1254	8996

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EXAMINER
LEE, CHUN KUAN

ART UNIT	PAPER NUMBER
2181	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/805,338	NISHIZONO ET AL.
	Examiner	Art Unit	
	Chun-Kuan Lee	2181	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>26 June 2008</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>2-9,11-18 and 20-28</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>2-9,11-18 and 20-28</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>22 March 2004</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☒ All   b) ☐ Some * c) ☐ None of:

   1. ☒ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

CONTINUED EXAMINATION UNDER 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/26/2008 has been entered.

RESPONSE TO ARGUMENTS

2.   Applicant's arguments filed 06/26/2008 have been fully considered but they are not persuasive. Currently, claims 1, 10 and 19 are canceled, and claims 2-9, 11-18 and 20-28 are pending for examination.

3.   In response to applicant's arguments (on page 11) regarding the amended independent claims 2, 11, 20 and 28 rejected under 35 U.S.C. 103(a) that the combination of references does not teach/suggest the claimed feature of dynamically switching to either the "first system" or "second system" according to the number of enqueued control blocks monitored; applicant's arguments have fully been considered, but are not found to be persuasive.

The examiner respectfully disagrees, as the examiner relied on the reference as following for the teaching/suggesting of the above claimed feature:

AAPA teaches a first system, wherein the first system have lower transfer rate as request is transferred to each path one by one; a second system, wherein the second system have higher transfer rate as the request is transferred to all path concurrently; and a cache memory for enqueuing control blocks with reconnection information (Drawings, Fig. 6 and Specification, p. 4, l. 16 to p. 6, l. 11, p. 7, ll. 5-26; p. 9, ll. 5-16).

Coates teaches dynamically switching to either operating at lower transfer rate (e.g. first system) or operating at high transfer rate (e.g. second system) according to the number of enqueued data (e.g. control blocks) monitored (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32).

4.   In response to applicant's arguments (on page 12, 2nd paragraph) regarding the amended independent claims 2, 11, 20 and 28 rejected under 35 U.S.C. 103(a) that the combination of references does not teach/suggest the amended claimed feature that when the number of the enqueued control block is not larger than a predetermined number immediately after said switching to said second system, said switching maintains execution to the second system for a predetermined time and thereafter switches the system to said first system; applicant's arguments have fully been considered, but are not found to be persuasive.

The examiner respectfully disagrees, as the examiner relied on the reference as following for the teaching/suggesting of the above claimed feature:

AAPA teaches a first system, wherein the first system have lower transfer rate as request is transferred to each path one by one; a second system, wherein the second system have higher transfer rate as the request is transferred to all path concurrently; and a cache memory for enqueuing control blocks with reconnection information (Drawings, Fig. 6 and Specification, p. 4, l. 16 to p. 6, l. 11, p. 7, ll. 5-26; p. 9, ll. 5-16).

Coates teaches when the number of the enqueued data is not larger than a predetermined number (e.g. above the upper threshold limit) immediately after said switching to a higher transfer rate (e.g. second system), said switching maintains execution to the second system for a predetermined time and thereafter switches the system to a lower transfer rate (e.g. first system) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32), when immediately after switching to the higher transfer rate the buffer fullness drops below the upper threshold limit, the system will still operate in the higher transfer rate as the buffer fullness has not reach below the lower threshold limit, and after the predetermined amount of time when the buffer fullness reaches below the lower threshold limit, the system then switches to the lower transfer rate.

5.   In response to applicant's arguments (on page 12, 3rd paragraph to last paragraph) regarding the amended independent claims 2, 11, 20 and 28 rejected under 35 U.S.C. 103(a) that there is not motivation to combined the cited references; applicant's arguments have fully been considered, but are not found to be persuasive.

        Please note that the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the

claimed invention where there is some teaching, suggestion, or motivation to do so

found either in the references themselves or in the knowledge generally available to one

of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.

1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, <u>AAPA</u> teaches the cache memory (Fig. 6, ref. 30) able to enqueue

data including the control blocks for reconnection (Specification, p. 2, ll. 20-26; p. 3, ll.

12-20; p. 4, ll. 2-8; p. 4, l. 25 to p. 6, l. 11, p. 9, ll. 5-16); <u>Coates</u> teaches a FIFO buffer

for enqueuing data, wherein FIFO buffer provide flow control based on whether the

amount of data euqueued in the FIFO buffer is above or below a certain threshold (Fig.

5; col. 3, ll. 36-50 and col. 11, ll. 21-32); it would have been obvious to combined

<u>Coates</u>'s FIFO into <u>AAPA</u>'s cache memory for the benefit that not only is the FIFO buffer

a well known robust buffering scheme, further providing the benefit of preventing the

FIFO cache from becoming full or empty during data transferring (<u>Coates</u>, col. 1, ll. 11-

24).

I. <u>REJECTIONS BASED ON 35 U.S.C. 112</u>

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

6.   Claims 2-9, 11-18 and 20-28 are rejected under 35 U.S.C. 112, second

paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.

Claim 2 recites the limitation "the system" in lines 24, 29 and 31. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "the system" in lines 25, 27 and 32. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 recites the limitation "the system" in line 26. There is insufficient antecedent basis for this limitation in the claim.

Claim 28 recites the limitation "the system" in line 21. There is insufficient antecedent basis for this limitation in the claim.

As per claims 2, 11, 20 and 28, it is not fully clear as to which system the applicant is referring to.

As per claims 3-9, 12-18 and 21-27, dependent claims 3-9, 12-18 and 21-27are also rejected at least due to direct/indirect dependency on the rejected independent claims 2, 11, 20 and 28.

II. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 2, 9, 11, 18, 20 and 27-28 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Coates et al. (US

Patent 6,694,389).

8.   As per claims 2, 11, 20 and 28, AAPA teach a storage apparatus and a

reconnection controlling method comprising:

        a physical device (Drawings, Fig. 6, ref. 2a); and

        a storage controlling apparatus (i.e. controller) (Drawings, Fig. 6, ref. 3) disposed

between said physical device and a host (Drawings, Fig. 6, ref. 4) to control an access

from said host to said physical device (Specification, page 1, l. 22 to page 2, l. 2);

        said storage controlling apparatus comprising:

                one or more host interface modules (Drawings, Fig. 6, ref. 20), connected

        to a plurality of channels (Drawings, Fig. 6, ref. 50) of said host through a plurality

        of paths belonging to the same path group, for controlling an interface with said

        host (Specification, page 2, ll. 17-19);

                a management module (Drawings, Fig. 6, ref. 20) for generally managing

        the whole of said storage controlling apparatus (Specification, page 2, ll. 20-21);

                said management module comprising:

                        a reconnection queue for enqueuing control blocks storing

                reconnection information on one or more input/output requests among

                input/output requests from said channels of said host (Specification, p. 5,

                ll. 5-16 and p. 9, ll. 5-16), wherein the enqueued I/O requests are issued

for reconnection and each I/O request is controlled and regulated in order to obtain reconnection success; therefore, there it would be obvious to include the queue of control blocks with reconnection information associated with the queue of I/O requests waiting for reconnection; and

a controlling mean, when an I/O process corresponding to one of said one or more control blocks managed in said reconnection queue is resumed, for controlling resumption of said I/O process in either

a first system of issuing a reconnection request to each of said paths belonging to the same path group one by one through said host interface module and requesting said host interface module to perform said I/O process using a path first successful in reconnection at the point of time that the reconnection succeeds (Specification, page 7, ll. 5-16), wherein the implementation of the first system would result in the lower transmission rate as the requesting is implemented one by one, or

a second system of issuing concurrently or almost concurrently the reconnection request to said plural paths belonging to the same path group through said one or more host interface modules and requesting said host interface module to perform said I/O process using a path which first succeeds in the reconnection (Specification, page 7, ll. 17-26), wherein the implementation of the second system would result in the higher

transmission rate as the requesting may be implemented to more than one host interface module, and further more, there must be the controlling mean in order to properly operate in either the first system or the second system.

AAPA does not expressly teach the storage apparatus and the reconnection controlling method comprising wherein said management module comprising:

the control means for the first system and the second system;

a monitoring means for monitoring the number of said enqueued control blocks in said reconnection queue;

a switching means for dynamically switching the system to be executed by said controlling means to either said first system or said second system according to the number of the enqueued control blocks monitored by said monitoring means; and

wherein when the number of said enqueued control blocks monitored by said monitoring means ... .

Coates teaches a method and a apparatus for data flow control comprising:

a control means for transferring at a lower rate (e.g. first system) (Fig. 5, ref. 540) and transferring at a higher rate (e.g. second system) (Fig. 5, ref. 520) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32);

a monitoring means for monitoring a number of enqueued data (e.g. control blocks) in a buffer (e.g. reconnection queue) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32), as the fullness of the buffer is monitored;

a switching means for dynamically switching the system to be executed by said controlling means to either said lower transfer rate (e.g. first system) or said higher transfer rate (e.g. second system) according to the number of the enqueued data (e.g. control blocks) monitored by said monitoring means (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32), wherein the switching means dynamically switching to the lower transfer rate if the number of the enqueued data is below the lower threshold limit and switching to the higher transfer rate if the number of the enqueued data is above the higher threshold limit; and

wherein when the number of said enqueued data (e.g. control blocks) monitored by said monitoring means is not larger then a predetermined number (e.g. above the upper threshold limit) immediately after said switching means switching the system to said higher transfer rate (e.g. second system), said switching means maintains execution to the higher transfer rate (e.g. second system) for a predetermined time and thereafter switches to the system to said lower transfer rate (e.g. first system) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32), as immediately after switching to the higher transfer rate the buffer fullness drops below the upper threshold limit, the system will still operate in the higher transfer rate as the buffer fullness has not reach below the lower threshold limit, and after the predetermined amount of time when the buffer fullness reaches below the lower threshold limit, the system then switches to the lower transfer rate.

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Coates's FIFO buffer flow control into AAPA's

management module's queuing of the requests not only for the benefit of having a well known robust FIFO buffer for caching data but also for the benefit of implementing a robust flow control in association with the FIFO buffer to ensuring the FIFO buffer does not become full (congested) or empty (starved) during transmission of data (Coates, col. 1, ll. 11-24) to obtain the invention as specified in claims 1, 10, 19 and 28.

9.   As per claims 9, 18 and 27, AAPA and Coates teach all the limitations of claims 2, 11 and 20 as discussed above, where AAPA further teaches the storage apparatus and the reconnection controlling method comprising wherein when said second system is executed, said controlling means successively requests the second and later paths which succeed in the reconnection to perform the I/O processes corresponding to one ore more control blocks which can be reconnected among said control blocks managed in said reconnection queue (AAPA, Specification, page 7, l. 17 to page 9, l. 1).

10.   Claims 3-8, 12-17 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Coates et al. (US Patent 6,694,389) as applied to claims 2, 11 and 20 above, and further in view of Mizuno (US Patent 6,922,743).

        AAPA and Coates teach all the limitations of claims 2, 11 and 20 as discussed above, but AAPA and Coates does not teach the storage apparatus and the reconnection controlling method further comprising:

wherein said management module further comprises a management table for managing a use status of each of said paths through said one or more host interface modules; and

when either said first system or said second system is executed, said controlling means refers to said management table to issue the reconnection request to the corresponding paths set free in said management table through said host interface module.

Mizuno teaches a system and a method comprising:

a controller (Fig. 5, ref. 530) comprising a cross-call administration table (Fig. 5, ref. 540); and

wherein the cross-call administration table provides the status of a port (e.g. ready flag) that a I/O path is connected to (Fig. 8, ref. 825, 835), and further more, the cross-call administration table is read out to determine which of the channel control processors (Fig. 5, ref. 505) controlling the ports are not busy in order to carry out the reconnection process (col. 9, II. 13-26).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Mizuno's cross-call administration table and the corresponding ready flag into AAPA and Coates's management module for the benefit of increasing the data throughput to the host as the response to the host's request can be made rapidly (Mizuno, col. 4, II. 39-43) to obtain the invention as specified in claims 3-8, 12-17 and 21-26. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

the management module comprises the cross-call administration table with the ready flag; and

when operating in either the first system or the second system, the control mean reads out the cross-call administration table in order to determine, through the host interface module (e.g. channel control processors), which of the I/O path is not busy to implement the reconnection process.

III. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

a(1) CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, claims 2-9, 11-18 and 20-28 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chun-Kuan (Mike) Lee whose telephone number is (571) 272-0671. The examiner can normally be reached on 8AM to 5PM.

IMPORTANT NOTE

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C.K.L./

August 13, 2008   Chun-Kuan (Mike) Lee
                                                        Examiner
                                                        Art Unit 2181

/Alford W. Kindred/

Supervisory Patent Examiner, Art Unit 2181